

CASE REPORT

Atopic Optic Neuritis

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ABSTRACT *Purpose:* To report a case of optic neuritis associated with atopic dermatitis, which may represent an optic nerve counterpart of atopic myelitis. *Methods:* Clinical examination, MRI, blood investigations. *Results:* A 34-year-old man with severe atopic dermatitis developed a steroid-responsive bilateral optic neuritis. Serum IgE was highly elevated, with high titers of mite-specific IgE. Clinical ophthalmological fluctuations paralleled those of atopic dermatitis. *Conclusions:* The clinical features and parallel fluctuations strongly suggest that the patient's optic neuritis was related to atopic dermatitis. This atopic optic neuritis may represent the optic nerve equivalent of atopic myelitis.

KEYWORDS Atopic dermatitis; IgE; optic neuritis

INTRODUCTION

An inflammatory myelopathy, termed atopic myelitis, has been reported in adult Japanese patients with atopic dermatitis (eczema) and/or asthma.¹ The atopic dermatitis in these patients is associated with high levels of immunoglobulin (Ig) E and dust-mite antigen-specific IgE.^{1,2} Histopathological studies show inflammation with eosinophilic infiltration, demyelination, and axonal loss. The lesions of atopic myelitis occur predominantly in the cervical spinal cord.³ Atopic myelitis is characterized by a Th2-type cytokine predominance, in contrast to the optic-spinal form of multiple sclerosis (MS) also seen more commonly among Japanese MS patients, which shows a Th1-type cytokine predominance.²

The reasons for this specific central nervous system localization and for atopic myelitis being reported exclusively in Japanese patients are unclear. We report the first European case of optic neuritis associated with a strong atopic diathesis.

CASE REPORT

A 34-year-old Englishman had had atopic dermatitis and asthma since infancy, treated with frequent courses of oral steroids and bronchodilators. At age 33, in 2002, he developed, over one month, blurred vision and pain with eye movements, coinciding with an exacerbation of asthma and atopic dermatitis. Visual acuity was 20/60. On color vision testing, he identified 1/17 Ishihara plates in both eyes. Funduscopy showed slightly swollen optic discs bilaterally. There was no evidence of anterior or posterior uveitis. Pupils were equal in

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size, but pupillary responses were noted to be sluggish bilaterally. Goldmann visual field testing showed bilateral temporal paracentral scotomas with irregular margins, located mainly within the inferior quadrants, but including the blind spot and extending up to 5° above the horizontal meridian, not respecting the margins of horizontal or vertical meridian, extending medially to 5° of the center of the visual field on the right and 10° on the left, and almost completely inferiorly and temporally on both sites. The remainder of the neurological examination was normal. On magnetic resonance imaging (MRI), the brain was normal with no lesions suggestive of inflammation or demyelination. Both optic nerves were slightly enlarged. There was increased signal intensity of the whole optic nerve on STIR images. The optic nerves enhanced diffusely with gadolinium, and enhancement extended to involve the intracanalicular segments of the optic nerves (Fig. 1). There was no evidence of a compressive process in the orbit on short tau inversion recovery (STIR) images or of any abnormality in the pituitary fossa. Cerebrospinal fluid (CSF) showed a normal opening pressure, normal cell count, protein level, and no oligoclonal bands. CSF IgE levels were not tested. Tests for antinuclear antibodies, anti-double-stranded DNA antibodies, antineutrophil cytoplasmic antibodies, anti-reticulin, anticardiolipin, anti-thyroid antibodies, anti-parietal cell antibodies, immunoglobulin electrophoresis, serum vitamin B₁₂ levels, and red

blood cell folate levels were either negative or normal. Screening for a large panel of infectious agents was negative. Genetic testing for Leber's hereditary optic neuropathy was negative. Visual evoked potentials revealed bilaterally delayed P100 latency (217 ms in the right eye and 211 ms in the left eye), with a slight decrease in amplitude. Brain-stem and somatosensory evoked potentials were normal. Following three days of intravenous methylprednisolone, acuity returned to 20/25 within 2–3 days. Four months later, Humphrey visual field tests were normal. A year later, he suffered a worsening of asthma and eczema, followed by blurred vision, retro-orbital pain, and bi-frontal headache. Visual acuity was 20/60 and, on color vision, he read 1/17 Ishihara plates in both eyes. His optic discs were pale and serum IgE was 4366 U/ml (normal: <114). He scored six out of six on a test for dust-mite antigen-specific IgE. Measurements of Th1 and Th2 cytokines were not made. Intravenous methylprednisolone led to dramatic and rapid improvement in his asthma, atopic dermatitis symptoms, retro-ocular pains, and headaches. Visual acuity returned to 20/25 and color vision to 17/17 Ishihara plates in both eyes.

Currently, two years later, he has milder residual visual symptoms. There have been fluctuating visual blurring and eye pain, which parallel fluctuations in eczema and serum IgE levels (although they are persistently above the upper limit of normal, but <300 U/ml when not symptomatic) and improve after the administration of corticosteroids.

DISCUSSION

Optic neuritis can be a first manifestation of MS or part of established MS.⁴ However, atypical features including bilaterality and a gradual onset need to raise suspicions of alternative etiologies. IgE (atopic) myelitis is a relatively new entity recognized in Japanese patients, predominantly males. Fluctuations are frequent in this inflammatory disease. The cervical cord is most commonly involved and displays hyperintense lesions on T2-weighted imaging on MRI.^{3,5} Histopathologically, there is mononuclear cell infiltration, with T cells more abundant than B cells, and also eosinophilic infiltration. Both myelin and axons are damaged.³ The pathophysiological mechanisms involve a Th2-type immune response, characterized by cytokines such as IL-4, increased IgE, and high titers of dust mite-specific IgE. This is in contrast to the optic-spinal form of MS,

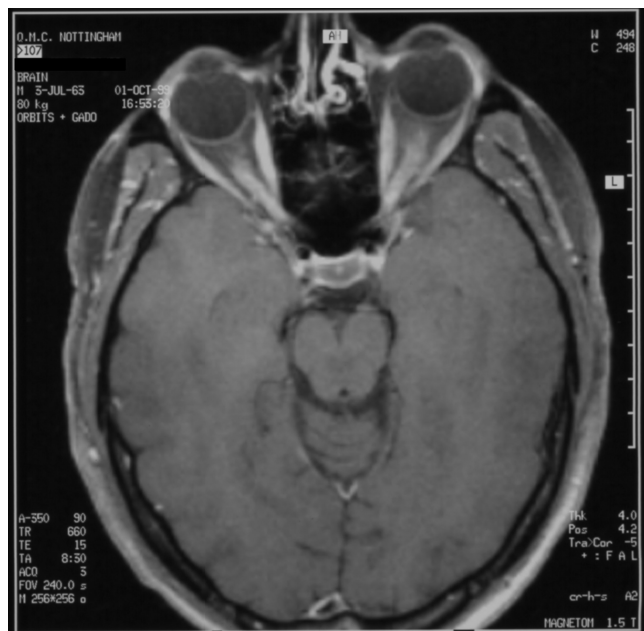


FIGURE 1 Axial T1-weighted image after gadolinium administration showing a normal-appearing brain and pituitary fossa and enlarged optic nerves with diffuse enhancement.

which, like classical MS in the Western hemisphere, is characterized by a Th1 response. In our patient, although cytokine levels were not measured, and in the absence of a comparison group, the presence of high total and dust mite-specific IgE suggests Th2 predominance inadequately counteracted by Th1 cytokines such as interferon-gamma.

To date, atopic optic neuropathy has not been described. To our knowledge, this may be the first European patient with atopic CNS involvement. Clinical and electrophysiological changes in our case also suggest damage to both myelin (delayed VEP) and axon (slightly reduced P100 amplitude, pale discs). Our patient had a highly elevated serum IgE and peripheral eosinophilia. The probable mechanism of atopic optic neuritis is IgE-stimulated eosinophilic CNS damage, as in atopic myelitis. This case demonstrates that atopic CNS involvement may not be restricted to the spinal

cord or to Japanese patients, and supports investigating atopic etiology in optic neuritis with atypical features or in atopic patients.

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